January 2002

# A Simulated Economic Analysis of Altering Days on Feed and Marketing Cattle on Specific Value-Based Pricing Grids

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Cattle producers should remember, even with value-based pricing, they are still selling pounds of beef. If the market price exceeds the costs, selling more is better than selling less.

**Summary**

*Profit can be increased by feeding some pens of cattle additional days on feed and selling on a pricing grid that rewards quality. Discounts for Yield Grade 4 and heavy weight carcasses for as many as 10% to 15% of a pen may not exceed the premiums for higher grading carcasses and the benefit of selling additional weight on all cattle sold. While the grid price can be increased by feeding some pens of cattle fewer days and marketing on a yield grade rewarding grid, net returns are often decreased because of selling fewer total pounds.*

## Introduction

Some cattle producers have been selling fed cattle on various value-based pricing systems, frequently referred to as pricing grids, for several years. While there are many different pricing grids, the majority tend to pay premiums for USDA Choice or higher grading and Yield Grade 1 and 2 cattle. Discounts are applied to Select or lower grade and Yield Grade 4 and 5 cattle. Too heavy or too light carcasses, as well as other nonconforming carcasses (dark cutter, stags, hard bones) also are discounted. To be successful marketing cattle on a grid not only requires that managers match cattle to the appropriate grid, but may also require a change in feeding and other management practices.

Some managers, targeting grids with large premiums for lean cattle, have reduced the number of days cattle are fed, while others have increased the number days cattle are fed and have marketed on grids with higher premiums for higher grading cattle. However, due to the biological antagonisms between marbling and leanness and due to the grid pricing structure, altering days on feed does not always achieve a higher price. Furthermore, when the number of days fed is altered the effect on carcass weight and feed costs also must be considered. The purpose of this report is to evaluate the economic consequences of altering the number of days cattle are fed. The evaluation will consider different types of cattle and different pricing grids.

## Procedure

Eight actual pens of cattle were used to illustrate difference in value for different types of cattle marketed on different pricing grids. The pens varied considerably in the percentage cattle grading Choice or higher and in the percentage of cattle that were Yield Grade 1 and 2. The average of the eight pens of cattle is fairly representative of the average fed cattle slaughter mix in the United States. The cattle averaged 61% Choice or higher grade, and 54% of the cattle were Yield Grade 1 or 2. The

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percentage of the eight pens of cattle with various quality and yield grades is displayed in Table 1.

Table 2 presents three general value-based grid pricing systems. While these were not the exact premiums and discounts for any actual grids, they are very representative of the varying premiums and discounts available on alternative grids. The commodity grid is typical of a number of different packer grids. The yield grade rewarding grid is typical of those grids that are more concerned with rewarding leaner cattle, while the quality rewarding grid is typical of many of the grids rewarding the higher grading type cattle. The base price for each grid is a formula tied to the average dressed price, the USDA Choice-Select spread, and the percentage cattle grading Choice.

Prices were compared for the eight individual pens on the three grids and against the average dressed market price. The following assumptions were made for the pricing example: average dressed market price was $100/cwt., the USDA Choice-Select spread was $7.00/cwt. and the plant average for the base price was 60% Choice or higher grade. These values are based on averages from January 1994 through December 2000.

A simulation analysis was performed to evaluate the economic consequences of feeding two of the pens an additional two weeks and of feeding one of the pens two fewer weeks. The following assumptions were used for the simulation: 1) ADG was 2.7 lb. for the two additional weeks and dressing percentage increase 0.5 percentage points which equated to 30 lb. additional carcass weight; 2) ADG was 3.0 lb. for the last two actual weeks of feeding and marketing two weeks early would have reduced dressing percentage by 0.3 percentage points which equated to 30 lb. less carcass weight; 3) marbling scores changed 30/100 in two weeks and the quality grade on individual carcasses was adjusted accordingly; 4) approximately one-third of the carcasses changed one yield grade; this was adjusted based on fat thickness and carcass weight; 5) total cost of gain for the two additional weeks was $21 ($.55/lb. gain X 38 lb.) and the cost savings for the two fewer weeks was $19.74 ($.47/lb. gain X 42 lb.), these costs were based on $2.50/bu. corn price and $0.30/head/day yardage charge; and 6) a stable market price was assumed.

**Table 1. Percentage of the cattle in each of the Quality and Yield Grade Categories.**

| | Yield Grades | | | | | |
|---|---|---|---|---|---|---|
| Quality Grade | 1 | 2 | 3 | 4 | 5 | Total |
| Prime | 0.00 | 0.00 | 0.69 | 0.35 | 0.00 | 1.04 |
| Upper 2/3 Choice | 0.52 | 5.70 | 8.29 | 0.69 | 0.00 | 15.20 |
| Choice | 0.86 | 20.03 | 23.14 | 0.69 | 0.00 | 44.73 |
| Select | 4.49 | 21.59 | 11.74 | 0.00 | 0.00 | 37.82 |
| Standard | 0.52 | 0.69 | 0.00 | 0.00 | 0.00 | 1.21 |
| Total | 6.39 | 48.01 | 43.87 | 1.73 | 0.00 | 100.00 |

**Table 2. Premiums and discounts for three alternative grids.**

| | Commodity | Yield Rewarding | Quality Rewarding |
|---|---|---|---|
| Prime | $6.00 | $3.00 | $10.00 |
| Upper 2/3 Choice | $1.50 | $0.00 | $3.50 |
| Choice | $0.00 | $0.00 | $0.00 |
| Select | -$7.00 | -$5.95 | -$8.05 |
| Standard | -$17.00 | -$8.95 | -$23.05 |
| Yield Grade 1 | $2.00 | $3.00 | $1.00 |
| Yield Grade 2 | $1.00 | $2.00 | $1.00 |
| Yield Grade 3 | $0.00 | -$1.00 | $0.00 |
| Yield Grade 4 | -$15.00 | -$20.00 | -$12.00 |
| Yield Grade 5 | -$20.00 | -$25.00 | -$17.00 |
| Lt. & Hy. Carcass | -$15.00 | -$15.00 | -$15.00 |

**Table 3. Carcass characteristics on eight individual pens of cattle and the net grid prices on three alternative grids based on a $100/cwt. Dressed weight price.**

| Pen | % Choice | % YGI-2 | % Outs | HCW | Comm. Grid | Yield Grid | Quality Grid |
|---|---|---|---|---|---|---|---|
| 1 | 80 | 62 | 4 | 658 | $103.57 | $103.37 | $103.90 |
| 2 | 81 | 37 | 0 | 749 | $103.10 | $102.80 | $103.17 |
| 3 | 78 | 37 | 7 | 800 | $101.91 | $101.27 | $102.16 |
| 4 | 58 | 72 | 0 | 745 | $101.78 | $102.47 | $101.24 |
| 5 | 60 | 37 | 0 | 776 | $101.63 | $101.55 | $101.39 |
| 6 | 31 | 74 | 0 | 709 | $99.88 | $101.80 | $98.54 |
| 7 | 30 | 92 | 14 | 842 | $97.52 | $99.20 | $95.84 |
| 8 | 16 | 79 | 36 | 875 | $93.69 | $95.72 | $91.55 |
| | | Average | | | $100.81 | $101.07 | $100.37 |

## Results

The net prices received for the eight pens of cattle on the three different grids are displayed in Table 3. Clearly, the pens of cattle with a higher percentage of cattle grading Choice were rewarded with a higher price. Likewise, for cattle of an equal quality grade, leaner cattle (lower yield grades) also received a higher price. The top pens received a premium of more than $20 per head ($3.00 premium * 7 cwt.) over the average cash market (this assumes they would have received the average dressed market price). On the other hand, the poorer quality cattle were discounted more than $40 per head. The average price premium from selling all eight pens on each of the grids varied from $0.37 to $1.07 per cwt. of carcass, or $2.85 to $8.24 per head based on the 770-pound average carcass weight.

Table 4 contains the results of the economic simulation of feeding two pens of cattle two additional weeks to improve the quality grade. Pen 6 had an improvement in the percentage cattle grading Choice from 31% to 48%, a decrease in the percentage of Yield Grade 1 and 2 carcasses from 74% to 50%, an increase in the percentage of Yield Grade 4's from 0% to 5%, and average

**Table 4. Economic simulation results of feeding two additional weeks.**

| | | Commodity Grid | Yield Grid | Quality Grid |
|---|---|---|---|---|
| Pen 6 | | | | |
| | Original Price ($/cwt) | $99.88 | $101.08 | $98.54 |
| | Simulated Price ($/cwt) | $100.43 | $100.64 | $99.91 |
| | Original Revenue ($/head) | $709.14 | $717.68 | $699.65 |
| | Simulated Revenue ($/head) | $743.22 | $744.74 | $739.37 |
| | 2 weeks Feeding costs ($/head) | $21.00 | $21.00 | $21.00 |
| | Additional Return from Feeding longer ($/head) | $13.08 | $6.07 | $18.72 |
| Pen 5 | | | | |
| | Original Price ($/cwt) | $101.63 | $101.55 | $101.39 |
| | Simulated Price ($/cwt) | $100.50 | $98.75 | $101.44 |
| | Original Revenue ($/head) | $788.65 | $788.05 | $786.81 |
| | Simulated Revenue ($/head) | $810.06 | $795.93 | $817.58 |
| | 2 weeks Feeding costs ($/head) | $21.00 | $21.00 | $21.00 |
| | Additional Return from Feeding longer ($/head) | $0.41 | -$13.12 | $9.76 |

**Table 5. Economic simulation results of feeding two fewer weeks.**

| | | Commodity Grid | Yield Grid | Quality Grid |
|---|---|---|---|---|
| Pen 3 | | | | |
| | Original price ($/cwt) | $101.40 | $101.27 | $102.16 |
| | Simulated price ($/cwt) | $101.78 | $102.00 | $101.42 |
| | Original Revenue ($/head) | $815.28 | $810.15 | $817.32 |
| | Simulated Revenue ($/head) | $783.71 | $785.38 | $780.95 |
| | Feeding costs Savings ($/head) | $19.74 | $19.74 | $19.74 |
| | Additional return from reduced feeding ($/head) | -$11.83 | -$5.03 | -$16.63 |

carcass weight increased from 710 to 740 lb. Pen 5 had a larger increase in the percent grading Choice from 60% to 86%, the percentage of Yield Grade 1 and 2's declined from 37% to 12%, the number of heavy weight carcasses (> 950 lbs.) increased from 0% to 12%, the number of Yield Grade 4's increased from 0% to 6%, and average carcass weight increased from 776 to 806 pounds.

In general, increasing the number of days on feed was profitable. For pen 6 on all three grids and for pen 5 on the quality grid, the improvement in quality grade and the additional weight that is being sold more than off set the decline in price from an increase in yield grade and more than off set the added costs under all three grids. However, with pen 5, net returns from additional days on feed were negative with the yield grid and were only marginally increased on the commodity grade grid. This was primarily due to the fact that now 18% of the pen was heavy weight and/or Yield Grade 4 carcasses.

The opposite situation is presented in Table 5, which is a pen of cattle that was simulated to have two weeks fewer days on feed to decrease fat and enhance the yield grade of the cattle. The percentage grading Choice declined from 78% to 65%, the percentage of Yield Grade 1 and 2's did increase from 37% to 58%, the number of Yield Grade 4's declined from 7% to 4%, and averaged carcass weight decreased from 800 to 770 lbs. Returns are negative for this scenario under all three grids. The reductions in carcass weight and in quality grade have a greater impact than the improvement in yield grade. These results may not hold for all pens and certainly as feed costs increase this alternative will be more favorable. However, it is critical that cattle producers recognize that while the market price increased on two out of three grids, net returns decreased on those two grids because of the reduction in carcass weight sold. Selling for the highest price does not always result in the largest profit.

These results are based on three specific pens of cattle and on one average market scenario. In general, as the USDA Choice-Select spread increases, it would be even more profitable to feed cattle additional days. Likewise, the higher the overall market price, the more profitable it is to feed cattle longer because each successive pound is worth more in a higher market. Conversely, as the Choice-Select spread decreases and as feeding costs increase, the profit potential from feeding additional days would decrease and it would be more likely that feeding fewer days could be profitable on a yield grade rewarding grid.

Cattle that are generally grading on the border of Select and low Choice would be impacted more by altering days on feed than cattle that are predominantly Select or predominantly Choice. The uniformity of the pen with regard to carcass weight, yield grades and quality grades also will have a major impact on the success of feeding fewer or additional days. The less uniform the pen, the more likely that significant discounts will be applied to "Out" cattle.

If a manager is considering altering the number of days on feed to fit a particular pricing grid, carcass weight and feeding costs must be considered in addition to the grid priced received to determine the overall profitability of the strategy.

Lastly, this analysis assumed a stable market price. If the market price increases or decreases in the time period considered, results would be altered from those presented.

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